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Indian Standard

SPECIFICATION FOR COLD-ROLLED STEEL STRIPS FOR CARBON STEEL RAZOR BLADES

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SPECIFICATION FOR COLD-ROLLED STEEL STRIPS FOR CARBON STEEL RAZOR BLADES

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Indian Standard

SPECIFICATION FOR COLD-ROLLED STEEL STRIPS FOR CARBON STEEL RAZOR BLADES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 11 March 1980, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Since long a need has been felt by razor blade industry for a national standard covering the requirements for steel strips for the manufacture of razor blades. A major portion of this steel is being imported at present. It is felt that the publication of this standard will bring many manufacturers in this field to help the Indian blade industry.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS: 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for cold-rolled high carbon steel strips for the manufacture of razor blades.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to supply of cold-rolled high carbon steel strips shall conform to IS : 8910-1978†.

2.2 Cold-rolled steel strip shall be supplied in annealed and re-rolled condition.

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*Rules for rounding off numerical values (*revised*).

†General technical delivery requirements for steel and steel products.

2.3 Cold-rolled strips shall be supplied in the form of coils with uniform tension to ensure that no damage is caused by overlight winding. Mass of each coil shall be within the range of 10 to 25 kg. Any other mass of coil may be accepted subject to mutual agreement between the purchaser and the manufacturer.

2.3.1 The minimum continuous length in a coil shall not weigh less than 10 kg and coils having mass up to 25 kg, shall not contain more than three continuous lengths and the discontinuity shall be indentifiable.

3. MANUFACTURE

3.1 Strips shall be manufactured from steel made by open hearth, electric furnace, basic oxygen or duplex process or by a combination of these processes. In case any other process is employed in the manufacture, prior approval of the purchaser shall be obtained. If the basic oxygen process is employed for manufacture, the nitrogen content of steel shall not exceed 0·007 percent.

NOTE — Nitrogen content of the steel should be ensured by the mauufacturer by occasional product analysis.

4. CHEMICAL COMPOSITION

4.1 The ladle analysis of steel when determined in accordance with the appropriate part of IS : 228* shall be as given below:

Constituent	*Percent*
Carbon	1·1 to 1·3
Manganese	0·35 *Max*
Silicon	0·25 *Max*
Sulphur	0·020 *Max*
Phosphorus	0·025 *Max*
Chromium	0·2 to 0·5

NOTE — Sulphur and phosphorus together should not exceed 0·04 percent.

4.2 Product Analysis — The permissible variation in the case of product

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*Methods of chemical analysis of steels (*second revision*) (issued in various parts).

from the limits specified in **4.1** shall be as given below:

Constituent	*Variation Over the Specified Maximum or Under the Minimum Limits, Percent, Max*
Carbon	0·03
Manganese	0·04
Silicon	0·03
Sulphur	0·002
Phosphorus	0·002
Chromium	0·03

NOTE — Variations shall not be applicable both over and under the specified limits in several determinations in a heat.

5. HARDNESS TEST

5.1 One sample shall be taken for the hardness test for every tonne of a charge or a part thereof.

5.2 Hardness testing of razor blade steel strip shall be carried out according to vickers micro-hardness testing method (*see* IS:9258-1979*) and the load on the indentor diamond (= the test load) be chosen as high as possible, avoiding, however, any form of deformation on the reverse side of the strip. Normally a load of 500 or 1 000 g is recommended.

5.2.1 Hardness of razor blade steel strip in the annealed and cold-rolled condition shall be 240-300 *HV*.

6. MICROSTRUCTURE

6.1 Steel strips shall be microscopically examined [*see* IS:7739 (Part I)-1975† and IS:7739 (Part V)-1976‡] and shall have spherodised and finely dispersed cementite in a matrix of ferrite. The carbide particle size should be fine and uniform. The steel should be free from slag or any other non metallic inclusion.

6.2 Carbide Density — The carbide density shall be measured by taking a photograph of the micro-structure of the steel at 1 000 × magnification and counting the number of carbides in an area of 1 cm^2. For better average, it is recommended that an area of 9 cm^2 be selected and the number of carbide particles counted. The number of carbide particles per square cm can be found by dividing the actual count by 9.

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*Method for vickers micro-hardness testing of metals.

†Code of practice for preparation of metallographic specimens: Part I General features.

‡Code of practice for preparation of metallographic specimens: Part V Iron and steel and their examination.

6.2.1 The carbide density shall be 20-35 per cm^2 at a magnification of 1 000×.

7. FREEDOM FROM DEFECTS

7.1 The cold-rolled steel strip shall be free from harmful surface defects, such as scales, rust blisters, laminations, pitting, cracked edges, etc.

8. RETEST

8.1 Should any of the test pieces selected fails to pass any of the tests specified in this standard, two further samples shall be selected from the same lot for testing in respect of each failure. Should the test pieces from both these additional samples pass, the material represented by the test samples shall be deemed to comply with the requirements of that particular test. Should the test pieces from either of these additional samples fail the material represented by the test samples shall be deemed as not conforming to this standard.

9. EDGE CONDITION

9.1 Cold-rolled steel strip shall have slit edges reasonably free from burrs.

10. DIMENSIONS AND TOLERANCES

10.1 The dimensions and tolerances on width and thickness of cold-rolled strips shall be as follows:

Width	22·40±0·05 mm
Thickness:	
a) Thick	0·127±0·007 mm
b) Medium	0·100±0·005 mm
c) Thin	0·080±0·005 mm

10.2 Camber

10.2.1 The transverse variation of thickness shall not exceed 0·005 mm.

10.2.2 *Edge Camber (Straightness)* — There shall be no lateral bends or edge camber of greater magnitude than 10 mm in 2 metres.

10.2.3 *Edge Ripple* — Edge ripple shall not be permitted in the strip.

11. SURFACE FINISH

11.1 Cold-rolled steel strips shall be supplied with dull and very fine surface finish.

12. PACKING

12.1 Cold-rolled steel strip coils shall be suitably packed to prevent them from rusting and damage during transit. As a special case against rust, suitable preventives may be applied on the coil before packing, if the purchaser demands.

13. MARKING

13.1 Every coil of strip shall be legibly marked with:

a) name or trade-mark of the manufacturer,

b) size, and

c) cast number or any other identification mark by which coil may be traced to the cast from which it was made.

13.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

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